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EXAMINER	
CHOW, YUK	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/808,586	ARAI ET AL.	
	Examiner	Art Unit	
	Yuk C. Chow	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08/08/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1, 3-15, 17-20** are rejected under 35 U.S.C. 102(b) as being anticipated by Hoekstra (US Patent 6,005,538).

As to claim **1**, Hoekstra discloses a driving circuit (Fig. 3) for a vacuum fluorescent display having a filament (Fig. 3(26)), a grid electrode Fig. 3(24)) and a segment electrode (Fig. 3(20a-g)), the driving circuit comprising:

a filament driving unit (Fig. 3(50)) for driving the filament;

a grid driving unit (Fig. 3(46)) for pulse-driving the grid electrode;

a segment driving unit (Fig. 3(42)) for pulse-driving the segment electrode; and

a controlling unit (Fig. 5(92)) for enabling or disabling the filament to be heated with an output (Fig. 5(60)) of the filament driving unit, the controlling unit disabling the filament to be heated with the output of the filament driving unit (Fig. 8, interval B) during an ON period when the ON period is shorter than a predetermined time period (see Col. 4 lines 13-32, duty cycle is representing predetermined time period), the ON period being a time period during which a voltage able to drive the grid electrode and the segment electrode is applied to both of the grid electrode and the segment electrode (see Col. 2 lines 35-48, ...segment selecting circuit applies a particular polarity to

segment... and grid driver circuit applies *that* particular polarity to the grid in order to illuminate the device).

As to claim **3**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 1, wherein the controlling unit outputs (Fig. 5(44,48)) a pulse driving signal for pulse-driving the filament (Col. 5 line 62-Col. 6 line18).

As to claim **4**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 1, wherein during the time ON period (Fig. 8(A)) shorter than the predetermined time period, the controlling unit fixes (Col. 6 line 36, ...***causing*** *the filament to* ***ride*** *at*...) the output of the filament driving unit at a predetermined level (Fig. 5($-V_{kk}$), also see Col. 6 lines 31-34).

As to claim **5**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 1, wherein the driving circuit for a vacuum fluorescent display receives a setting data from an exterior (Fig. 5(98)), and wherein the controlling unit: disables the filament to be heated with the output of the filament driving unit during the ON period that is shorter than the predetermined time period when the setting data received from the exterior is at the some logic value; and enable the filament to be heated with the output of the filament driving unit when the setting data received from the exterior is at the other logic value (Col. 5 line 61-Col. 6 line 18).

As to claim **6**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 5, wherein the driving circuit for a vacuum fluorescent display receives from an exterior a dimmer adjustment data (Fig. 5(98)) correlated with the duty ratio of the output of the grid driving unit or the output of the segment driving unit, and

wherein the ON period is a time period of the pulse width based on the duty ratio corresponding to the received dimmer adjustment data (Col. 6 lines 19-59).

As to claim **7**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 1, wherein the driving circuit for a vacuum fluorescent display receives from exterior a dimmer adjustment data (Fig. 5(98)) correlated with the duty ratio of the output of the grid driving unit or the output of the segment driving unit, and wherein the controlling unit (Fig. 5(92)) disables the filament to be heated with the output of the filament driving unit during the ON period when the ON period based on the duty ratio corresponding to the received dimmer adjustment data is shorter than the predetermined time period (Col. 6 lines 19-59).

As to claim **8**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 1, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit (Fig. 5(92)), the driving circuit enabling a switching element (Fig. 5(Q1)) that generates a voltage (Fig. 8(5V))for pulse-driving the filament to be connected to exterior based on the output (Fig. 5(44) of the filament driving unit (Col. 5 line 61-Col. 6 line 18).

As to claim **9**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 1, comprising a switching element (Fig. 5(Q1)) that generates a voltage (Col. 6 line 6-14) for pulse-driving (Col. 6 line 20) the filament based on the output of the filament driving unit (Col. 5 line 61-Col. 6 line 18).

As to claim **10**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 9, wherein the driving circuit for a vacuum fluorescent display

is a semiconductor integrated circuit (Fig. 5(92), the driving circuit enabling the switching element (Fig. 5(Q1)) to be connected (Fig. 5(C2, R32)) to exterior.

As to claim **11**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 9, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit integrated (Fig. 7(90) with the switching elements (Col. 7 lines 46-59).

As to claim **12**, Hoekstra discloses a driving circuit (Fig. 3) for a vacuum fluorescent display having a filament (Fig. 3(26)), a grid electrode Fig. 3(24)) and a segment electrode (Fig. 3(20a-g)), the driving circuit comprising:

a filament driving unit (Fig. 3(50)) for driving the filament;

a grid driving unit (Fig. 3(46)) for pulse-driving the grid electrode;

a segment driving unit (Fig. 3(42)) for pulse-driving the segment electrode; and

a controlling unit (Fig. 5(92)) for enabling or disabling the filament to be heated with an output of the filament driving unit, the controlling unit enabling a pulse width and/or a pulse cycle of a pulse (Col. 6 line 20) driving signal for pulse-driving the filament to be set based on data (Fig. 5(98) received from exterior when enabling the filament to be heated with the output of the filament driving unit (Fig. 5(60), also see Fig. 8(interval A) and Col. 4 lines 33-51).

As to claim **13**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 12, wherein the data received from exterior includes pulse width data (Fig. 8(A)) for setting the pulse width of the pulse driving signal, and wherein

the controlling unit generates the pulse (Col. 6 line 20) driving signal having a pulse width corresponding to the received pulse width data (Col. 6 lines 19-59).

As to claim **14**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 12, wherein the data received from exterior includes pulse cycle data (Fig. 8) for setting the pulse cycle of the pulse driving signal, and wherein the controlling unit generates the pulse driving signal having a pulse cycle corresponding to the received pulse cycle data (Col. 4 lines 13-51).

As to claim **15**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 12, wherein the data (Fig. 5(44) received from exterior includes pulse width data (Fig. 8) for setting the pulse width (Fig. 8(A)) of the pulse driving signal and pulse cycle data (Fig. 5(60)) for setting the pulse cycle of the pulse driving signal, and wherein the controlling unit sets the pulse width and/or the pulse cycle of the pulse driving signal by putting the pulse driving signal at one level (Col. 6 line 27, duty cycle does not exceed 50%...) for a time period of the pulse width corresponding to the received pulse width data, and by putting the pulse driving signal at another level (Col. 6 line 48, between 50-80%) for a time period other than the pulse width among the pulse cycles corresponding to the received pulse cycle data (Col. 6 lines 19-59).

As to claim **17**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 12, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit (Fig. 5(92), the driving unit enabling the switching element (Fig. 5(Q1)) that generates a voltage (Fig. 8(5V)) for pulse-driving the

filament based on the pulse driving signal (Fig. 5(R32,C2)) to be connected to the exterior (Fig. 5(92)).

As to claim **18**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 12, wherein the driving circuit for a vacuum fluorescent display comprises a switching element (Fig. 5(Q1)) that generates a voltage (Fig. 8(5V)) for pulse-driving the filament based on the pulse driving signal (Fig. 5(R32,C2)).

Regarding claims **19,20**, limitations within these claims are identical to claims **10, 11** respectively. Therefore, same rejections apply to these claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim **16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra (US Patent 6,005,538) in view of Harris (US Patent 4,968,917).

As to claim **16**, Hoekstra discloses a driving circuit for a vacuum fluorescent display according to claim 15 above.

However, Hoekstra does not teach a **first comparing unit** for comparing the pulse width data with a count value based on a reference clock signal; a **second comparing** unit for comparing the pulse cycle data with a count value based on a reference clock signal; a **counting unit** for generating the count value by dividing as predetermined the reference clock signal as well as resetting the count value when the

result of the comparison at the first comparing unit or the second comparing unit shows coincidence; and a **controlling unit** for putting the pulse driving signal at one level when the result of the comparison at the first comparing unit shows coincidence, and for putting the pulse driving signal at the other level when the result of the comparison at the second comparing unit shows coincidence.

Harris discloses a dimmer controller for VFD wherein utilizes a dual comparator (Fig. 1(35)), a controlling unit (Fig. 1(40)) which also function as a count unit (Col. 4 lines 19-42).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize dual comparator circuit of Harris into vacuum fluorescent display driver of Hoekstra, because it would improve the usability of control circuit and offer finer adjustment to the brightness level as suggested by Harris (Col. 1 line 64- Col. 2 line 61).

Response to Amendment

5. Applicant's arguments filed 08/08/2007 have been fully considered but they are not persuasive. Applicant asserts, "Hoekstra is not seen to disclose at least the features that the controlling unit disables the filament to be heated with the output of the filament driving unit during an ON period when the ON period is shorter than a predetermined time period, the ON period being a time period during which a voltage able to drive the grid electrode and the segment electrode is applied to both of the grid electrode and the segment electrode." However, examiner respectfully disagrees. In particular, Hoekstra discloses a vacuum fluorescent display driver and method for driving a vacuum

fluorescent display device according to an aspect of the invention includes providing a segment selecting circuit which selectively applies electrical potential of a particular polarity to a segment to illuminate that segment and a grid driver circuit which applies electrical potential of that polarity to the grid in order to illuminate the device (see Col. 2 lines 35-48). For example, positive potential is applied to grid and segment electrodes during ON period.

6. Applicant also submits, "Hoekstra is not seen to discloses at least the features that the controlling unit enables a pulse width and/or a pulse cycle of pulse driving signal for pulse-driving the filament to be set based on the data received from exterior when enabling the filament to be heated with output of the filament driving unit." However, examiner respectfully disagrees. There isn't any distinct feature in claim 12 as comparing to claim 1. Applicant recites a pulse width or a pulse cycle of pulse driving signal in claim 12, but this is commonly known as an On/Off period with variation of duty cycle (see Hoekstra Col. 3 line 40- Col. 4 line 12). Nonetheless, a pulse cycle could be defined as a DC square wave or any shape of signal within a period.

7. Regarding claim 16, applicant submits, "Harris is not seen to....teach, discloses or suggest the features recited by claim 16...". However, examiner respectfully disagrees. Harris suggests a dual comparator that is used for detecting whether the DIM Select is between LR1 and LR2, the comparator is associated with timing t (see Harris Fig. 2(t) also Col. 5 lines 30-62).

Conclusion

8. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuk C. Chow whose telephone number is 571 270-1544. The examiner can normally be reached on 8-6 M-TH E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amare Mengistu can be reached on 571 272-7674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YC
10/10/2007

AMARE MENGISTU
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